ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY
INTERVIEWS WITH
A.J. WARDREP

BY CHARLES W. CRAWFORD
TRANSCRIBER - BRENDA MEIER
ORAL HISTORY RESEARCH OFFICE
MEMPHIS STATE UNIVERSITY

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OCTOBER 5, 1972

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ORAL HISTORY RESEARCH OFFICE

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PLACE Knoxville, Tenn.

DATE Oct. 5, 1972

A J Wardrep
(Interviewee)

Charles W. Crawford
(For the Mississippi Valley Archives
of the John Willard Brister Library
of Memphis State University)

(OHRO Form B)

THIS IS THE ORAL HISTORY RESEARCH OFFICE OF MEMPHIS STATE UNIVERSITY. THE PROJECT IS "AN ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY." THE PLACE IS KNOXVILLE, TENNESSEE. THE DATE IS OCTOBER 5, 1972, AND THE INTERVIEW IS WITH MR. A. J. WARDREP, FORMERLY WITH THE TENNESSEE VALLEY AUTHORITY. THE INTERVIEW IS BY DR. CHARLES W. CRAWFORD, DIRECTOR OF THE MEMPHIS STATE UNIVERSITY ORAL HISTORY RESEARCH OFFICE, AND WAS TRANSCRIBED BY MRS. BRENDA P. MEIER.

CRAWFORD Mr. Wardrep, I suggest that we start with some early background information about your own life. You might start when and where you were born; then go through your early life, your education, your experience up until you joined TVA, and then we'll try to go through your TVA work in order.

WARDREP I was born in Knoxville on December 21, 1906, and I attended school in Knoxville. The first school I went to was the old Vangilder School; then on through, and finally graduated from Knoxville High School in 1923. In the fall of 1923 I entered the University of Tennessee in mechanical engineering, and I went to Tennessee for the 1923 session, '24 and '25. In the summer of 1926 I decided that I had rather go to school somewhere else, and on January 1, 1927 I entered the School of Engineering at Vanderbilt University, and went the rest of that year and the following year. In the spring of 1929 I graduated from Vanderbilt with a Bachelor of Engineering in Mechanical Engineering.

Then I came out of Vanderbilt and went to work in Knoxville in a business with my father and grandfather on ready-mix concrete. We made and sold ready-mix concrete, and that was the first one in the city of Knoxville --

the first ready-mix concrete plant. We got competition and the Depression began to work on us, so we went out to Kansas. My father contracted a railroad job in Kansas and I left and went out there and worked building bridges and culverts for the Missouri-Pacific Railroad until early in 1931, when we finished the job out there. I came back and got a job then with the U. S. Engineers, Chattanooga District, as a surveyman, and my first job was core drill inspector. I worked at various survey tasks with the Chattanooga district most of that year, and since the Depression was pretty hard at that time, they ran out of money and I didn't have any work that winter. But the next spring I started back with the Chattanooga District, and in the meantime I had applied for employment with the U. S. Engineers in the Vicksburg District. And in the fall of 1932 I was employed by them on the bank protection work out of the Greenville, Mississippi Sub-Office of the Vicksburg District. Well, they ran out of money, then in early 1933 I got laid off down there, so I came back to Chattanooga where I was reemployed and went to Clinton (it was not Norris then) in April of 1933, and I was there working when the TVA Act passed.

Then I was employed by the TVA on August 1, 1933 as the chief of a survey party. Now that takes care of my schoolwork and up until the time that I started with TVA, but I started working in the summer, back in 1921. My father was a contractor. He had been from back in the old days; he worked a lot of mules and did grade work, and had been in the contracting business since 1906, the year that I was born. So even though I was very young in the summer of 1921, I went to work on a road paving job, which incidently was the first that the state of Tennessee ever did. It was 15 miles of concrete paving between Athens and Charleston, Tennessee, in McMinn County, and I worked there that summer and part of the following summer. Then I went over to North Carolina with my father. We still were paving roads over around Rockingham, North

Carolina, and the following summer I was at Fairview, North Carolina; then, I believe, Murphy. Each summer I would work on a different paving project, wherever my dad happened to be working, so my construction experience started right at the end, I guess, of the horse-and-buggy days, and went on up into the space age.

CRAWFORD You started at about the age of fifteen, didn't you?

WARDREP I was really fifteen, I believe, when I started. (Since it was my father's job, I was allowed to.) He gave me a watch and a timebook, and I was what, in modern terms I believe, is called a time-study man. Since this was one of the first concrete paving jobs, I recorded the time that each batch went into the mixer, and if it took more than two minutes . . . or four minutes I think was the time . . . Anytime that it took longer than that, I was to record the cause of the delay: "mixer broke down" or "broke the cable on the crane," or whatever reason for the delay.

CRAWFORD You'd had much more experience than usual then for your age, didn't you?

WARDREP Yes, sir. I worked all the time that I wasn't going to school there for fifty years, 1921 to 1971. The paver that did this road job down there was steam driven. They hadn't even come out with gasoline-driven pavers at that time, and most of the power shovels were steam driven then. That's one of the things that I did back early in my construction career is fire the boiler on that steam shovel.

Of course, before I even went to work I used to spend a week or two with my Dad out on his construction job. I just loved that type of thing and enjoyed spending my time at it.

CRAWFORD That was the first paving construction job in Tennessee, wasn't it?

WARDREP Yes, sir. There was another paving contract awarded at this same time over in West Tennessee somewhere. Now, there had been, of course, concrete streets paved in the cities, but there was no Tennessee Highway Department. I'm not sure about this because I was just a little youngster, but it may have been that this paving was the first construction work that the Tennessee Highway Department did.

Mr. Webster, who was formerly head of the State Highway Department and later worked for TVA, I believe, told me that he thought that that was the first construction work the Tennessee Highway Department did.

CRAWFORD Do you remember if Austin Peay was the governor then?

WARDREP No, sir, I really don't.

CRAWFORE I think he organized the highway department in the early or the middle twenties. You were there at the very beginning of this sort of construction.

WARDREP That's right. During the war my father had graded and done some paving on roads up in what's now Fort Knox at Kentucky--during World War I--and he went from there down into the southern part of Georgia and did some asphalt paving. His partner was J. A. Kreis, a contractor here in Knoxville who did a lot of work, particularly railroad work. It was Kreis and Wardrep that had the first job there.

CRAWFORD You were at Norris, or rather Clinton, when the TVA Act was passed. What did you first think about it? When did you learn more about TVA?

WARDREP Of course, like most of the rest of the people then, my prime interest was in keeping on working, you know. Things were very rough in those days. I remember that I could get my car washed and greased for a dollar when I first went to Clinton, and we all, of course, were very much interested in seeing that project go through. The U. S. Engineers had a plan for the construction of the Cove Creek Dam, as they called it, and I remember reading the paper and listening to the radio and everything about what the President was doing in connection with organizing the TVA. I was very happy when I learned that the Act had passed, and of course, they began to change, then, the plans for construction of the dam from the plan that the U. S. Engineers had. I don't remember too much about the high-level part of it back then. My job was in the survey party. My party ran the property-line survey on the Longmire Property which was where the dam was located. One abutment of the dam was located on that property. Later on somebody else took that over and they sent me out on some special assignments from the U. S. Engineer office up at LaFollette.

Of course, after the Act passed, then we still continued to do these survey assignments until TVA actually got into the job. They did some work prior to August, but about the time that I went to work for TVA Mr. R. H. Foss was head of the branch of TVA that later became the Construction and Maintenance Branch. He was on the job one day and asked me if I'd had any construction experience, which is about all the experience that I had had, and I, of course, told them that I had. He asked me if I would like to work for construction, and I said that I would. So they moved me then from what became the Maps and Surveys Branch of TVA down to Norris, and I did all of the early work on the water system for the town of Norris. I cleaned out and built an enclosure around the spring, laid the pipelines for the pumping station and reservoir and supervised the laying of all the water mains around in the town of Norris,

and the sewage disposal plant was part of my job too.

CRAWFORD Now when did you first go to work for TVA; when did you change from the Corps to TVA?

WARDREP August 1, 1933.

CRAWFORD And you didn't really have to change your location, did you?

WARDREP No, I just kept right on with that same work that I had been doing.

CRAWFORD Were you living in Clinton at the time?

WARDREP I had been living in LaFollette and we weren't sure, none of us, that the TVA would give us a job. As soon as I learned that I was to work for TVA, I moved to Clinton.

CRAWFORD That would have been in August, then?

WARDREP In late July of '33 because we got notice a few days ahead of time.

CRAWFORD And you continued working for the Corps up until the time you went to TVA?

WARDREP That right. The Corps laid me off one day and the TVA picked me up the next.

CRAWFORD That was certainly a good job record at that time.

WARDREP Yes, sir. I've always felt fortunate about that. I was able to stay right on. Of course, I didn't dislike survey work, but I wasn't as well equipped for survey work as I was construction because I had been

in construction for ten, twelve years prior to that in the summer months.

CRAWFORD Of course, TVA's first work there had to be survey, I suppose, before the construction could get started.

WARDREP Right.

CRAWFORD But how did you apply for the work with TVA? Did they seek you out? Did you contact them?

WARDREP I contacted them. I filled out an application not too long after the TVA Act passed. I believe the first offices were in this building here, and our personnel director began to issue these forms that you filled out. I filled one of those out, certainly.

CRAWFORD Do you remember who you first met with at TVA?

WARDREP Mr. Ross White, I believe, was the first man that I can recall. He was construction superintendent out there. Now, I came over here to Knoxville and I met Carl Richey, I don't know whether he was director of personnel at that time, but certainly he was one of the first personnel men of TVA. But the people that I knew mostly were the ones out at the dam there, and of course, well remember Mr. Ross White, and I believe he's about one of the first people with TVA that I got acquainted with.

CRAWFORD Out at the Norris location? I've talked with Mr. Richey; he's now in Sacramento, California, and has been living there for some time.

WARDREP I can't even remember exactly why. I think it was in connection with the involvement of some men that we needed there in Norris,

but I remember coming to Knoxville in the very, very early days. I came to an office somewhere here in this building as I remember, and talked with him. And some of the first hourly construction employees that TVA had worked under my supervision there. Hendon Johnston and Mr. . . . (I've forgotten what the old gentleman's name was) were driving a shaft there at the site of Norris Dam, and their work started before mine did. Mine was the next work, I guess, that TVA did in construction.

CRAWFORD What did you do in your survey work at the Norris site?

WARDREP I did this property survey; that is the boundary of the Longmire property, and then we did some layout of core drilling, sub-surface investigation--places to take probings and that type of thing.

CRAWFORD Well, of course you wanted to know what sort of base you had to build on, I suppose.

WARDREP That's right. "Foundation investigation," I guess is the term for it.

CRAWFORD How long did this drilling take for the survey work?

WARDREP It was still in progress after I had started on the water supply for the town of Norris. They were driving shafts and core drilling. As I remember, the drawings for the dam were by no means complete at that time, and probably continued right on up until the dam was half built.

CRAWFORD What time or what date, then, did you leave the survey work?

WARDREP The best I can remember, it must have been somewhere around the middle of July. I just had gotten on to the work over at Norris

when they put me on the TVA payroll--within a week or two. I can't remember exactly.

CRAWFORD How long now did you work for TVA, approximately, before you went into construction and maintenance?

WARDREP I started off with the construction part. I was hired as a party chief at the town of Norris, but my job was supervising the investigation work for the water system, reservoir, pumping station and the pipelines. I hired a carpenter and some laborers (or TVA hired them for me) and we started the actual construction right along with the . . . We were locating and building as we went.

CRAWFORD So you worked on laying out the town of Norris for a while?

WARDREP That's correct.

CRAWFORD How well developed were those plans? Who was in charge of them?

WARDREP That work was being done here in Knoxville. Draper, I guess, was the top man.

CRAWFORD That would have been Earl Draper?

WARDREP Earl Draper; and Fred Weiss was actually on the site at Norris and he was supervisor of all the survey work that was going on there. By that time I had gotten into full-time on the construction part of it. Fred Weiss had several survey parties there, and they laid out the streets and that type of thing, and I think it was some of the other parties of the U. S. Engineers that made plane table surveys as soon as the TVA decided they were going to build this town, and I don't remember just exactly when that was.

CRAWFORD Do you remember what size the town was planned for then, and whether or not they had an idea of its being a permanent place?

WARDREP About the only thing that I can remember about it: I can visualize it in my mind, and it would be hard for me to say even just how many houses, but essentially the permanent houses--the ones that are still there--was the original idea, and they did build some lower-cost houses that were temporary and have since been demolished. But I remember one of the ideas behind the construction of the town of Norris was that they would do research in cheapening the cost of construction of permanent-type houses as they went along. I'm sure Mr. Draper was the "guiding light" in that investigation. I know they had to make quite a few changes in the houses as we went along. The design was quite new for that day and time. I know a lot of the things that they put in those houses such as copper pipe, and things of that type that were something new to me, that I hadn't seen before, but it was the latest thing.

CRAWFORD You thought they were well designed, then, and up-to-date?

WARDREP Oh, yes.

CRAWFORD What sort of water system did you plan for the city?

WARDREP The supply was from a spring. I know exactly where to locate it, but I don't remember any name that it might have. It's across the ridge from the town, back to the northeast a little bit, I believe, of Norris. We dug down into the rock to be sure that everything was clean down in there and built a concrete enclosure around this spring, and then put a pipeline from there--a ten-inch pipeline, which followed down the creek so that the pumps got their supply by gravity to the pumps. Then they pumped it up the hill to the reservoir, as I remember, around a 300 foot head. It was a very high head,

I know. The pumps were centrifugal, and that water system was one of the very latest--the last word--in automation. The gentleman that designed it was . . . I'll think of his name in a minute, but he was formerly with Metcalf and Eeddy, who wrote testbooks on hydraulics and that type of thing. The controls for the pumps were hydraulic and electric. I had a very interesting job with Mr. Kimball the man whose name I was trying to recall. He was the Supervising Design Engineer, ans the way the thing operated was when the reservoir filled, the water would run over to an over-flow pipe, and the over-flow pipe went on back down to the pump station. As the head built up in that pipe, it would activate an electric switch to cut the pump off. The normal way of doing that job at the time was to use an electric float switch, but they didn't use that. This system was much more fool-proof because you had no overhead lines or anything; you had an underground water pipe. As soon as that water ran over, out of the reservoir into it, and built up a hydraulic head, which in turn operated the switch.

CRAWFORD Did you have an adequate water supply? I suppose the spring never ran low there?

WARDREP It never ran low. That was one of the things that I did before we actually started construction--was to pump this spring for (I've forgotten now) seventy-two hours, I believe. And we built a weir across the discharge of the pump to see just how much water . . . We weren't able to pump it dry with a pump that pumped a thousand gallons a minute, and the supply is still adequate as far as I know. A thousand gallons a minute supply a pretty good town.

CRAWFORD Yes, and Norris is a nice town, but not especially large now.

WARDREP No. it never has grown a great deal.

CRAWFORD Do you get back to Norris?

WARDREP I've been out around there some. Some of the last work that I did: we built this laboratory for the forestry branch out there, just below Norris Dam, and went through there quite a bit then. That's been about two or three years, ago, or something like that.

CRAWFORD Are you pleased with the way the town has developed? Did it turn out as well as you thought it would?

WARDREP It did. It turned out to be a beautiful place, of course. I think everybody likes the looks of Norris. I think it cost more money than most people thought it would. I think that part of it might not have been successful in demonstrating how it could be built for less money. I think it cost us about as much. That would be my observation. But certainly it's been a desirable place to live.

CRAWFORD How long did this job take, Mr. Wardrep? When did you go from the water supply at Norris to another job?

WARDREP I went along August or September of 1934. I can't remember exactly. I was laid off; I was just informed that they had no more work for me there, and I came up here to Knoxville to talk to anybody I knew that might help me to get another job. Finally I worked a deal through this Mr. Kimball. He was with design, but he was already doing some design work on the rehabilitation of the Decatur, Alabama water system. The Wheeler project did back water up over part of the town of Decatur. I say "town" too, because that's what it was. It was a little place. He wanted to get information on the location of sewers, water mains and that type of thing to go along with his design. Mr. Kimball was instrumental in getting a sub-order given to the con-

struction group that Mr. Foss headed, and of course, since I had sort of worked this deal up Mr. Foss sent me down there to do the work in the late fall of 1934. We hired some laborers and did a lot of probing and actually dug out water mains and located sewer manholes. Now they had another engineering group down there too at that time which was headed by Cary Price--J. C. Price--and they were actually making surveys of all these things, but I did some more subsurface investigation for the design of what was called back-water protection in the town of Decatur. I stayed down there through the winter of 1934, '35, and in the spring of 1935 Mr. Foss's group, construction, was to begin the relocation of highways and bridges.

Just as I finished the sewers, they sent me over to the Elk Mills Bridge, they called it, over on the Elk River to see if the piers were founded on rock. I had to build a cofferdam and go down to the bottom of the pier, and I learned that it was not; it was founded on gravel. I was working at that job when Mr. Thomas D. Lebby came in down there as Construction Superintendent. The name was the Construction and Maintenance Branch by that time. I've forgotten just exactly what it was before that, and I stayed on with them then. After I did this work about the investigation of the bridge foundations . . . Of course, Design had to know these things so they could design the protection. They later put a concrete casement around these peirs and built them on up to where they would be out of the water. The up-river water level came up by thirty feet or more at that spot, as I remember. And the piers had to be protected for the deeper water and that sort of thing, and I think to be sure that they stayed there.

Mr. Lebby then assigned me to constructing culverts and small bridges. I started that somewhere around June of 1935, on through the middle of 1936. Early in 1936 they sent me up to help build the Guntersville Dam access

road, and I built a bridge and eight or nine culverts for that job. Then in the spring of '36, I was running out of work again, and they notified me that I would be laid off.

CRAWFORD Now in this time, until early '36, you had been working generally in the Decatur area, hadn't you?

WARDRE° That's right. I worked out of Decatur Construction and Maintenance Branch office and I worked around Mooresville, Alabama, just across the river from Decatur, culverts and bridges and just about everything in there until I went up to Guntersville. I was still working out of the Decatur office; the first work they did, of course, at Guntersville Dam was on the access road, to get into the place. It was a hurry-up job. We built culverts and bridges right in the dead of winter that year and hurried up and finished in the early spring, and had to start looking again.

CRAWFORD Now, you were relocating roads and things to go around the area that would be filled with water?

WARDREP That's right, and it is very low--right across the river from Decatur--and the water came out of the old river banks about a mile and a half in places, and of course, covered up some of the old roads that were down in there. In the Wheeler Reservoir area, there were miles and miles of roads that had to be relocated and the bridges raised, and that type of thing.

CRAWFORD You simply moved them further out of the flooded area to higher ground around the river's valley, I suppose?

WARDREP Either that, or in some cases just raised them on the same location--built up the fill and raised the bridge.

CRAWFORD Of course, they had survey the maximum level at which the water would be, I suppose?

WARDREP That's correct. The maps and surveys group had laid out the approximate contour at that time.

CRAWFORD Did you find any problems with the sewer system at Decatur that would be caused by the flood water or the water from the dam?

WARDREP Yes, there was considerable relocation of sewers there. These sewers were built, and some of the outfalls changed and moved back to empty into what would be Wheeler Lake, rather than go for a half mile underwater and empty out into the old river bed.

CRAWFORD Yes.

WARDREP All this was changed, and I don't remember . . . After I did the preliminary work I left that job, and when the actual construction was done I was working on Hiwassee project.

CRAWFORD Well, was the actual construction of this--the sewer change--made by the city of Decatur or by TVA?

WARDREP By TVA. The actual wark was done under the supervision of this same T. D. Lebby, and the engineer was J. C. Price, and it was all TVA work done by craftsmen and loborers hired by the TVA itself.

CRAWFORD TVA was very popular, I believe, in Decatur.

WARDREP I should say it was! I don't know whether anybody had mentioned this or not, but I've seen men wear their TVA construction badge to church. (Laughter) They were so proud of having that job that they put that

badge right on their Sunday clothes. And of course, another thing that they would wear them for is for getting credit. This little badge that they give construction workers was a very desirable thing to have in those days.

CRAWFORD Well, I know times were very hard in Decatur until TVA came, so I suppose any sort of work would have been very popular, but the work you did for the city in adjusting to this dam must really have helped.

WARDREP Yes, it did. I didn't deal very much with the city people like I did years later, but I know that everybody was happy. As far as I knew, the TVA had no enemy in those days. Everybody was very happy with what they were doing.

CRAWFORD You lived in the different localities where you worked, so you did have a chance to get to know the people and see what they thought of TVA.

WARDREP That's correct. I was fortunate in that when I went to Decatur, I got a room in the home of the former postmaster. A Mr. J. C. Crawford had been postmaster in Decatur for about eighteen years, and they rented me a room in their home, which was a lovely home. Of course, Mr. Crawford knew everybody locally, and we became very good friends. I enjoyed my stay down there. At the time I first went there just about every business establishment on Bank Street (that was Old Decatur, they called it), at that time it was two towns: Decatur and Albany, and just about every business establishment over there was boarded up. Decatur, I believe, was the worst hit area of any place I ever visited back in the Depression days.

CRAWFORD I've had some information about this by talking with Mr. Barry Shelton at the newspaper down there.

WARDREP Well, it was pitiful. That's about the best word that I can think of. Just to look at the place and see all these stores boarded up, glasses broken out, and everything. But apparently from the time that Decatur was the headquarters for the Reservoir Clearing Branch of TVA that employed some two thousand people (they worked for a couple of years there, and of course had a pretty good sized payroll), and I think that started them on the road back. From my visits in and out of Decatur, later on, it just seemed to gradually improve. Things just picked up, and haven't stopped yet.

CRAWFORD I can see why people would be very proud to wear their TVA construction badges.

WARDREP Yes, sir, I've seen a lot of them--their Sunday suits with that badge right on that coat!

CRAWFORD Well, now your work there lasted, doing this relocation--roads, bridges, sewer survey, and so forth--until the spring of '36, and that was when that work closed, wasn't it?

WARDREP Well, it was still in progress, but they just ran out of work for me and laid me off. Mr. Lebby and this group continued to work down there on through 1936 until, oh, sometime later. I don't remember just when.

CRAWFORD Was that the usual practice for TVA in dealing with its engineers; to use you on a given project, then to have a layoff when that ended until they found something else.

WARDREP I guess it was more my luck than anything that they didn't have another place to send me. Of course, I wasn't really very well known to Mr. Foss, who was the head of the thing, either I guess. He's the man who hired me originally, but I don't know how much effort he might have made

toward moving me to another project. It was so easy to get engineers and help of any kind--skilled, highly skilled or unskilled-- that normally they would just notify you that they would have no more work for you, and you had to scramble, which was what I did. I came back to Knoxville and started making the rounds again.

CRAWFORD Well, you had an application in here, I suppose, and you knew people in the TVA organization around the valley.

WARDREP Right.

CRAWFORD How long were you unoccupied then, before you started again?

WARDREP About a month. I ran into Fred Weiss here in Knoxville one day. I had been up talking with personnel and anybody that would listen to me, trying to get another job, and just happened to run into Fred Weiss coming out of one of the buildings. I told him I was looking for a job, and he said, "Well, I'm going to Hiwassee July 1st. Would you like to go over there?" I told him I certainly would.

CRAWFORD That was from the spring, then, until July 1st when you started at Hiwasee?

WARDREP That's right. I was actually off the payroll for something like a month there--maybe the month of June, 1936. Hiwassee, of course, is over in the southwestern corner of North Carolina.

CRAWFORD There's the Hiwassee River, Tennessee tributary.

WARDREP And that's the dam right there.

CRAWFORD Yes. Well, you were certainly over in the mountains there. You went over there with Fred, and then you went to work when they

started the Hiwassee project?

WARDREP Fred was the field engineer, which means he was in charge of all the engineering layout work on the project, and I went with him . . . went back to party chief--back in engineering then. Fred and I were two of the first people to get onto this project. I remember the first day we were there we walked from a place called Unaka, which is just a little village; I think one store, and I don't remember anything else much there. We walked from there down into the site of the dam--over logs, stumps, bushes, and everything else, and then we ran a line of levels from the existing benchmark there, close to Unaka, down into the dam, and started building an access road into the dam.

THIS IS THE ORAL HISTORY RESEARCH OFFICE OF MEMPHIS STATE UNIVERSITY. THIS PROJECT IS "AN ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY." THE PLACE IS KNOXVILLE, TENNESSEE. THE DATE IS OCTOBER 5, 1972, AND THIS IS INTERVIEW NUMBER TWO WITH MR. A. J. WARDREP. THE INTERVIEW IS BY DR. CHARLES W. CRAWFORD, DIRECTOR OF THE MEMPHIS STATE UNIVERSITY ORAL HISTORY RESEARCH OFFICE, AND WAS TRANSCRIBED BY MRS. BRENDA P. MEIER.

DR. CRAWFORD: Mr. Wardrep, let's start back at the beginning of the Hiwassee project, then--July 1, I believe it was, of 1936 when you went over there, What condition did you find? What was there when you arrived?

MR. WARDREP: It was a very primitive area. There had never been many people in that area other than fishermen or hunters, except the TVA engineers, I guess, had been in there. They made the preliminary surveys for this project. We had to start from scratch--that is, to build roads to get in there, The first day that Fred Weiss and I were there we had to walk into the job. The same day we got there construction moved in a couple of shovels and we had to work from the daylight in the morning until dark at night to get some stakes in the ground for these shovels to start work building the road. You couldn't do anything much until you got a way to get in there, and this is why we were in such a hurry to get a road in--so the equipment, the air compressors and shovels, and that type of thing could be brought to the site of the dam. We did, fo course, get these roads built and temporarily surfaced

These were temporary access roads that we built.

Then one of the early projects there was a bridge across the river. There was no way to go from one side of the river to the other except in a boat. You couldn't get a big boat to that side because the river drops forty feet to the mile just below there in a place of two. And so we got our bridge built, and then, of course, they started the excavation for the abutments for the dam and set up the construction plant, the warehouse and cableway. The dam was built by use of the cableway to pour the concrete. My job was Chief of the Layout Party; for the first month that I went there, I believe, I was called an Instrument Man, but Fred gave me a raise to Party Chief pretty quick, and I actually worked as a Party Chief the whole time that I was there until the Spring of 1938.

DR. CRAWFORD: Did you have any workers there or any machinery when you first went there?

MR. WARDREP: They got there the same day we did. They unloaded two shovels, some air compressors, and some various other equipment that they needed. It was under the direction of Mr. Lex Phifer, who I believe at that time was called the Assistant Construction Superintendent on the dam itself. Later, I guess, Mr. Walters came in and actually supervised the construction of the dam. But as I say we worked from daylight in the morning (and no extra pay for this either). We'd get up and get out on the job at daylight in the morning, as soon as we could see to use our survey instruments, and worked until dark that night. Then as soon as we got the roads staked out, of course, we could relax. This went on for about pretty close to a month, until we had the

stakes set to keep everybody busy.

DR. CRAWFORD: That was very wild country in there.

MR. WARDREP: Very wild, with great big boulders the size of this room and big trees. If it had been logged, it had been years and years before that. And it was pretty rough country too; that is, there was no such thing as a flat place.

DR. CRAWFORD: Where did you live and where did the people who worked on the dam live there?

MR. WARDREP: We lived at the town of Murphy, and drove back and forth each day--nearly twenty-five miles by road. But Murphy was the nearest habitation; it's the only place we could find to get a room and a place to eat. We had a TVA station wagon that we drove back and forth to work each day.

DR. CRAWFORD: What about the laborers?

MR. WARDREP: They brought in a few skilled people such as shovel operators that came from Norris Dam over there. Mr. Phifer had been at Norris and hired local laborers; just the tree cutters and more or less unskilled labor was hired locally. I don't remember too much about these people here, but going back to the Wheeler project, I've never seen before or since a group of people that would work as hard as those people did.

DR. CRAWFORD: Do you think hiring local labor was a good policy then?

MR. WARDREP: Oh, yes. I think so. In other words, if TVA was to benefit the local area, they had

to spend some of their money there. That was one of the good ways to do it because you've got poeple that had been accustomed to working and knew what it was to do a day's work in a place over there around Hiwassee. Of course, there were a few exceptions. Some of those fellows didn't want to do anything but fish, but you soon found out who they were.

DR. CRAWFORD: Well, now, some of the people worked by the hour didn't they? You'd get out at daylight and work until dark, but some poeple were on an hourly wage, I suppose.

MR. WARDREP: Yes, all of the construction, so-called craftsmen and laborers were on an hourly rate. The construction supervisors and the engineers were on an annual rate. Somewhere in the books they marked down the overtime that we put in with the idea of giving us time off later, but those things are pretty easily forgotten. I didn't mind because even in 1936 jobs were very difficult to find. If I had gotten out of a job with TVA then, I probably would have had to do a lot of hunting. That's one of the things that we used to talk about there. There is no such thing as an engineer making a mistake because if he did, he was gone. The policy was pretty rigid in those days. You put in a lot of time and thought on your job to be sure that you didn't make a mistake because it would be costly and you could just expect not to be there any longer. Mr. Phifer, who was the superintendent, would just tell you in so many words that the woods were full of engineers, and if you didn't get it and get it like he wanted it, he'd go out there and scare one of them out.

DR. CRAWFORD: Well, I'm sure that must have produced a

very good quality of work?

MR. WARDREP: Yes, sir, it certainly did and we didn't think too much about it. I mean nobody resented it at the time.

DR. CRAWFORD: Were you married then? Did you have a home somewhere?

MR. WARDREP: No, I was still unmarried at that time. I moved out; as the job went along there at Hiwassee we built bunkhouses, and when the space became available in a bunkhouse, I moved out there on a job. I don't remember just when that was. It was approximately a year, I guess, after we started.

DR. CRAWFORD: Then you didn't have to drive back and forth

MR. WARDREP: Then we didn't have to drive back and forth I was fortunate in the driving back and forth in that I could ride with Fred, and he drove a TVA vehicle, so that helped. But for a while there, I had to furnish my own transportation. I guess Fred moved out before I did--out to the job. He had a house there; he was married and had a house. So I got in with another group and paid my own transportation after that. But Hiwassee was the highest dam that TVA had built at that time, and was higher than Norris. It was very much like Norris; the designs were somewhat similar, as you can tell by looking at the dams or pictures of them. It was a very interesting project.

DR. CRAWFORD: Did you have many special problems building one that far back, away from everything?

MR. WARDREP: Yes, of course, it created problems for

the supervision. All the cement had to be hauled from the railroad over at Turtletown, Tennessee, and we actually set up a crushing plant and crushed the rock and made the sand right there on the job--a quarry. But all of the machinery and everything had to be hauled in from the railroad at Turtletown. Now the main access road on the left bank of the river was built by contract. It's about twelve or fourteen miles, I guess, from the dam down to Turtletown, and this work was going on at the same time that we were doing our work there, after them. And fairly early in the life of this job we got this bridge built and were able to come in from the Unaka side in cars and trucks, and drive across. A lot of the village; that is, the houses and the bunkhouses were built before there was any access available from that side because the contractor was working on this access road.

DR. CRAWFORD: Did the dam building get more efficient as time went on and you got more experienced.

MR. WARDREP: Yes, on each job. For instance, the first concrete poured took longer. You didn't pour as many yards in an hour as you did later on. It just took a little time to get these operations down to an efficient basis. With experience, you gained efficiency to get these tasks done. Of course, I left Hiwassee right in the middle of it, where you had already poured concrete. But the thing from then on was pretty much a sort of stereotyped operation: raise forms and pour, and raise forms and pour, and of course, that is not true as long as you are excavating your foundation and you run into things you don't know about.

DR. CRAWFORD: You found a good foundation base, I suppose, over there, didn't you?

MR. WARDREP: Oh, wonderful. Even then, of course, some grouting was done to consolidate the foundation for a dam there.

DR. CRAWFORD: And is that still TVA's highest dam?

MR. WARDREP: No, Fontana. I'm sure Fontana is the highest TVA dam. It's, of course, in North Carolina, but it's on up further north. It's (Fontana Dam) on the Little Tennessee River here.

DR. CRAWFORD: Now, it was in the Spring of '38 that you left the Hiwassee project, wasn't it?

MR. WARDREP: That's correct, and I came back to my family's home. My father died that spring, and I helped my brother get all these things straightened out. I was ready to go back to work for TVA, then, and did go back. I talked to Hendon Johnston, who was then with the Project Planning Branch of TVA, and they were working over at Watts Bar. They were core drilling and testing and all their foundation investigation for Watts Bar, and sometime in December of 1938 I went back to work for the Project Planning Branch of TVA.

DR. CRAWFORD: Now, let's see. You were away from TVA several months, then, in '38?

MR. WARDREP: Around six months--a little over six months.

DR. CRAWFORD: You were in Knoxville at that time, I

suppose?

MR. WARDREP: Yes. We owned the farm, and Farragut School took one corner out of the farm of my family over there. My youngest brother was a farmer, and as we got things all squared away, why, I was ready to go back to TVA.

DR. XRAWFORD: Why did you go to that project? Did you know someone there?

MR. WARDREP: I talked to Hendon Johnston, and Hendon, of course, was a supervisor there and he knew what I could do and said he had work for me. I didn't even go back to construction and ask because when Hendon came along and said he had this job, I just took it.

DR. CRAWFORD: Yes. Well, Hiwassee was still going on at that time, though, wasn't it?

MR. WARDREP: Oh, yes. Hiwassee was still in progress.

DR. CRAWFORD: But you wanted to go to the other place?

MR. WARDREP: I knew without even asking that I probably would have problems getting in over there because all the jobs of the type that I would want were filled. They had people. In fact, they were getting through with some of those people, and they were being moved to other places by the time I was ready to go back.

I went to Watts Bar project, and again, it was just a field. It wasn't as primitive a location as Hiwassee. There were cultivated fields all around it and a ferry just up the river from it, and field roads--not good roads--but field roads into it. I went in there and started digging

test pits and doing wash boring and that type of thing to find out where the surface of rock was, and what kind of rock. A month or so later on, we moved some core drills in and started core drilling for the dam. I stayed there a short while, and in the Spring of 1939 (I've forgotten what time--fairly early spring) I got a call from Mr. T. D. Lebby, the man I had worked for in the Decatur Reservoir, and he wanted to know if I would be interested in going back over to Hiwassee.

DR. CRAWFORD: How do you spell Mr. Lebby's name?

MR. WARDREP: L-e-b-b-y. Mr. Lebby was a graduate of MIT, and had been in business for himself--Steel and Lebby Bridge Constructors here in Knoxville--and he was a very smart man. I learned a lot from Mr. Lebby and always enjoyed working with him, but he called and wanted to know if I would be interested in a job back over--this time in the Highway Relocation on the Hiwassee project. They had roads and bridges that had to be rebuilt over there. I talked to Hendon Johnston, and, of course, I was getting a raise to go back with Mr. Lebby, and I went on to that project then.

DR. CRAWFORD: You went back to Hiwassee?

MR. WARDREP: I went back to Hiwassee, but I lived in Murphy, and the office was there in Murphy, and of course, we worked all up and down both sides of the river. A good part of our work was right in Murphy.

DR. CRAWFORD: How long, now, did you stay at Watts Bar before you went back to Hiwassee?

MR. WARDREP: From December to about March, I think.

I'm not sure, but just a few months.

DR. CRAWFORD: Was Watts Bar just in the planning stage then?

MR. WARDREP: That's right; the construction organization was not even on the job. We set up a soil-bearing test there I remember. It was one of the things that we did. We put a water tank on top of a post that had a known area, to bear on the soil to see how much pressure pound per square inch it would stand, and there were a few other things that we did there, all in the nature of providing information for the dam design. I've forgotten, but sometime in the Summer of '39, you know, they did actually start work there. This was after I had gone back . . .

DR. CRAWFORD: In March of '39 you went back to Hiwassee?

MR. WARDREP: That's right.

DR. CRAWFORD: You lived in Murphy, then. How was the road and bridge location different there from what it had been at Wheeler?

MR. WARDREP: This was rugged, mountainous country at Murphy, and most of their drainage structures were high bridges rather than little culverts and low bridges like they were down in the Wheeler area. Of course, they had one or two high bridges in the Wheeler area on the Elk River and places like that, but primarily the jobs there were low--in the flat part of the area to be flooded, of course. At Hiwassee there was just no such thing as flat land, and in some cases we had to go back up a creek where the road had

crossed the creek, right adjacent to the river. We'd go maybe a mile back up the creek and have to build a mile or two of road to get to the bridge on each end and build a high bridge across the creek.

DR. CRAWFORD: Well, you had had experience in bridge building before, of course, when you were in Kansas, I believe, with the railroad before you even went with TVA?

MR. WARDREP: That's correct. Yes sir, we built three bridges for the Missouri Pacific out there. I stayed pretty closely connected with bridge building all the time I was working. One of the last bridge jobs I did was on the Tellica project down here. It was a pretty good size bridge.

DR. CRAWFORD: Of course, the bridges at Hiwassee, you had to build in very steep country, didn't you?

MR. WARDREP: Yes, sir. I don't guess there's any such thing as an average slope; it's just hilly and steep. There were just no flood plains of flat areas. The flatest area around there was right in the town of Murphy, and I'm sure that's why the town was there--because it was the only flat area in that section.

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DR. CRAWFORD: Mr. Wardrep, let's talk some more about your work at Hiwassee, which was the job we were discussing at the close of our last conversation yesterday. What sort of country was that? What did you find interesting about it?

MR. WARDREP: Some of the land in the reservoir area was between Murphy and the dam. Murphy was almost at the upper end of the impounded lake. Quite a bit of the property was owned by the eastern band of the Cherokee Indians, and I understood that TVA had some problems in acquiring property in that area because of the fact that they were not allowed to condemn land that belonged to Indians. It was necessary to negotiate with them and you just about had to agree to anything that the Indians asked in order to acquire this property.

Another interesting thing about this we learned in driving through this area: we noticed that a lot of the men would be sitting on the front porch whittling and the women would be back hoeing the garden or something like this. Of course, we were wondering how they got away with it, and we learned that most of these people were of Indian ancestory. One of the

largest creeks that flowed into the Hiwassee River between Murphy and the dam was named Hanging Dog Creek, and the story that we got locally was that in that area quite a while previously there had been two Indian chiefs that didn't get along too well, and they were constantly doing things to annoy each other. One of them killed the other's dog and hung him in a tree there, and from that time on that creek was known as Hanging Dog Creek. But there was very little housing in the area; there were very few farms. The area was just not suitable for anything except, you might say, hunting and fishing.

DR. CRAWFORD: How had that area changed by the time you left?

MR. WARDREP: Of course, on my first trip to Hiwassee, we did not do much in the way of improving roads. The roads were very, very primitive. The main road that went from Murphy to Unaka had a crushed stone surface on it, but none of the other roads did. Later on, when I came back to this area, we built new roads and some nicer housing began to build up, and the area began to develop a little more generally.

DR. CRAWFORD: And, of course, it's continued to develop since then. When did you leave the Hiwassee project finally?

MR. WARDREP: I left the Hiwassee project in June of 1938, and I resigned from TVA to go back to my home because my father had died. My father had operated a farm and I went back to help get things in shape. I stayed there at the farm until

December of 1938, and of course, on a farm during the winter you don't have much to do anyway, and I was ready to go back to work for TVA.

I got in touch with Hendon Johnston, who was in charge of the Project Planning Division work on the site of what is now Watts Bar Dam. The surveys for that project were pretty far along, almost completed, and the foundation investigation phase of the project had started, and they hired me on account of my construction experience to dig some test pits and set up some soil-bearing tests. A little bit later on we started core drilling the foundation for the dam. Watts Bar is on a different foundation from some of the other dams. It's on what the geologists call a Rome foundation; it's a shale formation rather than the usual limestone that some of the others have, like Fort Loudon Dam, for instance. The land of this shale formation comes up from Rome, Georgia or somewhere. I'm not too familiar with geology, but I do know that shale makes a fine foundation for a dam because it's more impervious to water than limestone. Of course, Watts Bar was part of the overall plan. One reason it was located in the general area was because it was at the upper end of Chickamauga pool, and the reason it was located exactly where it is is because the foundation was better right at that point.

DR. CRAWFORD: How long were you at Watts Bar?

MR. WARDREP: I only stayed there a few months. Of course, the test pit work and the other soil tests didn't require much time, and before this work was actually completed--along about March or April of 1939--I got a call from Mr. Thomas D. Lebby, who by this time had become the Chief of the Construction and

Maintenance Branch, with an office located at Chattanooga. Now Mr. Lebby had been the Field Superintendent in the Wheeler area and I had worked for him there. He called and wanted to know if I wanted to go back to the Hiwassee area, with the Construction and Maintenance Branch at that time. They were to start relocation of highways and bridges and do the back-water protection work in the Hiwassee reservoir.

Since the job he offered me was better than the one I had, of course, I accepted it after consultation with Hendon Johnston and the people I was working for at the time. I accepted the job at Murphy. Actually the C & M office (Construction and Maintenance) was located at Murphy, and I went back up there around the first of July, 1939. The Field Superintendent at that time was Johnny Burns. Mr. Burns was not well and he was not on the job too much, and a few months after we started work W. O. Pillitar took over as Supervisor of Construction in that reservoir. But we got started right away with relocation of highways, beginning down at the dam. All of the roads were located close enough to the main river so that lake covered them up at the points where they crossed the largest creeks--Hanging Dog Creek and some of the others--on both sides of the river.

The road work consisted of quite a bit of rock excavation since the roads had to be benched out of these steep slopes and several fairly high bridges to cross the creek at the point fairly close to the reservoir, rather than building a lot of road and going further back up the creek. We had quite a little work to do around the town of Murphy. The Murphy sewer system had to be altered to remedy the fact that some of the lake would be over a lot of it, and also the water system--the existing pumping station--

was below the future reservoir level, and had to be moved entirely. The engineer on the backwater protection was named Mr. J. C. Price who had been in Norris with us. The engineering on the highway work was by the TVA's Highway and Railroad Division, which was supervised by Mr. McGilverish. We had a pretty good job there; we worked all through the winter of 1939 and '40. I've forgotten just when the Hiwassee reservoir went in impoundment again, but we had completed all of the work in that area around a year after we started, in the mid-summer of 1940. And from Hiwassee then--from Murphy--I was moved in June or July. It was customary to make these moves at the beginning of the new fiscal year because the money became available, and back in those days as soon as TVA got money for a job, they started construction immediately. I went from the Murphy/Hiwassee area to Kingston, Tennessee. No, first it was Rockwood. This complete unit that I was working with--field unit with the Construction and Maintenance Branch--was moved to Rockwood, Tennessee.

DR. CRAWFORD: Was that the summer of 1940?

MR. WARDREP: That is correct, June or July--somewhere in the summer there of 1940. And we started this same road relocation, the backwater protection, in the Chickamauga reservoir. Chickamauga Dam, of course, just above Chattanooga, backed water up to Watts Bar. I'm going to have to correct that. It was not Chickamauga; it was Watts Bar that we were doing the backwater protection for. Some of the people on the Chickamauga backwater moved up in there too, and also the unit that Mr. Pilcher was head of, that I worked with, would move into Rockwood. We did just a very minor amount of work on Chickamauga, but our

principal job was the relocation of highways and bridges in the Watts Bar area, and this was a somewhat larger job than Hiwassee had been.

So they moved another unit in at Kingston about the same time we moved to Rockwood to begin the same type of work. I worked about three or four months with Mr. Pilcher there in Rockwood, and they had an opening with Ed Tate's unit, which was located at Kingston as a Cost Engineer.

I was moved from the Rockwood office, then, over to Kingston to function as the Cost Engineer on the same Chickamauga reservoir work. Shortly after I got there I was promoted to Assistant Superintendent to Mr. Ed Tate, who was Superintendent on the job. We had miles and miles of the road to rebuild because of the existing roads that run along fairly close to the Tennessee River. We started our work down in Meigs County, the work that I did with Ed Tate.

At Hiwassee a lot of the work had been with shovels and trucks because it was largely rock, but here in Watts Bar the type of work was very different. It was practically all dirt, and we used what is known as carry-all scrapers. The construction term for them in "pans". It's a earth-moving unit; it is a unit that is driven by a motor and loads itself and dumps itself. I remember some of these roads in the Watts Bar area were not as high a type road as you would build today. The roadbed width was relatively narrow, and sometimes we just rough graded as much as a half mile of road a day at the Watts Bar reservoir. There were quite a few miles to be built though, so we were in that area for quite a while.

DR. CRAWFORD: Essentially you were doing highway construction, weren't you?

MR. WARDREP: That is correct. Most of the work that we did was roads and bridges. Now the bridges are slower and of course, more expensive to construct than roads. The design engineers would try to locate a road where the cost was the least. If you located a road too close to your reservoir, it would have a big bridge and would cost a lot of money. And if you went back too far away from the reservoir, you had more miles of road, so they would strike a balance to make the road cost to TVA less by getting somewhere in between. They would have a medium-size bridge instead of a large one, and the road was not too much longer than it would have been if it had been built right up close to the reservoir. There was some other work connected with all of these reservoirs. For instance, in the town of Kingston there were still more sewers and more water mains to be adjusted to take care of the existing facilities that would be covered by water.

One of the things that we did in Kingston that is visible as you go through the town now is to construct a dike across the opening of a hollow that came down close to the old Clinch riverbed. We built this dike to keep the water from backing up and covering a good-size portion of the town of Kingston, and we built a pumping station there to keep the water pumped out. But of course, all you get behind the dike is storm water from the watershed in that area, and they had determined that it was cheaper to build this dike and to keep the water pumped out than it was to buy the land and relocate a sizable portion of the town of Kingston.

DR. CRAWFORD: Is Kingston still protected by that dike?

MR. WARDREP: It is still protected by that dike. As

you go through Kingston now you can see it. The dike is not too big as those things go, but it's readily visible, and the pumping station, of course, is there too.

DR. CRAWFORD: I suppose you designed plenty of safety margin into the dike?

MR. WARDREP: Yes, it's built so there is little or no chance of it ever washing out. The top of it is (I don't remember) probably above the 500-year flood, which is one of the things that the planners use; but it might occur every 500 years or something like that. This was in 1940 when we did this work, and they have never had any problems there. Now they have had problems with the pumping station. Somebody turned the gasoline loose in a filling station, and let it pour out and it went down into the sewer and got into the pumping plant; something there ignited it and it blew the pumping plant up, so they had to provide for a temporary pumping there for a while.

I don't remember just how much the work at TVA did in connection with rebuilding the pumping station after it blew up, but I personally looked after part of it. We put in a new pump that was designed with an electrical switch gear, so they would know that there would be no sparks in the future. They thought that might have ignited this gasoline, and TVA redesigned the pumping stations to some extent. Around 1960 or '61 my C & M unit sent some men in there and did some work on this pumping plant, but the dike itself, as far as I know, has never given a bit of trouble.

DR. CRAWFORD: What other work did you do at this point?

MR. WARDREP: The only work that I can remember that the

C & M unit had in that area was this highway--broken bridges--and the backwater protection, which did include, of course, the dike and the adjustments to the Kingston water system and to the sewer system.

Now the other units located over at Rockwood that I had been with previously did the same type work and they built roads on the Rockwood side of the Watts Bar reservoir; that is what's commonly known as the right bank. The unit that I was with at Kingston did the work on the left bank, and the Rockwood unit accomplished this backwater protection work--sewers and water system--in the town of Rockwood. Now that work continued on through until the time that water was impounded in Watts Bar reservoir.

I can't remember just when this was--sometime in 1941. In the early part of '41 the TVA decided to build what became known as the Hiwassee Projects. This was the Ocoee Number Three Dam, Appalachia Dam, and Chatuge Dam--the three together. Ocoee was over on the Cocee River, but Appalachia was just below Hiwassee on the Hiwassee River, and Chatuge was on the Hiwassee River quite a bit above Hiwassee--about Hayesville, North Carolina. One of the projects is almost seventy-five miles from the other: Ocoee Number Three was almost seventy-five miles from Chatuge, but it was all built under the heading of the "Hiwassee Projects" and Mr. George Leonard was the Project Manager. Each one of the dams had a separate construction organization, but all of the other reservoir work, which was a considerable part of those projects, was assigned to the Construction and Maintenance Branch, and Lee Ragsdale was Superintendent. I was sent up there in the summer of 1941; again, as I recall--about June or July--as his assistant.

We had something like ten million dollars of railroad and highway work done--much in the way of railroad dealers in that area. There was a considerable amount of highway work, and we had one year even to do it in. By this time, in the summer of 1940, everything was getting pretty upset over in Europe, and the TVA would have to provide as much power as they could as fast as they could. Of course, Ocoee Number Three was another generating plant, and Appalachia was a generating plant, and while they did not at the time put in a generator at Hiwassee, it added to the capacity of the Hiwassee generating plant.

DR. CRAWFORD: Now this project started at what time, what date?

MR. WARDREP: In June or July of 1941; I'm not just positive. Normally those things started on July 1st on account of the fiscal year, but my memory has failed me on this Kingston project. I just now thought of something that I left out, and it was a considerable portion of that job; and that was the railroad relocation. I guess it's best to go back right now, isn't it, and bring that in?

DR. CRAWFORD: Yes, let's do.

MR. WARDREP: The C & O TP; that's Chicago and New Orleans, and whatever it is (division of the Southern). It went up through Harriman, Tennessee, and out toward Oakdale. That was one of the main lines of this railroad, and there are three or four spots along--I guess it's northeast of Harriman--that the Watts Bar Lake would cover the railroad, and the railroad had to be re-

located in those areas. It was actually raised almost at the same location, and heavier and longer bridges built. It was cheaper to relocate the railroad in this way than it was to try to go around, especially in the way of property. The area was somewhat built up and the property would have been rather expensive, so the cheapest way to accomplish this was to just build the fields up higher and build a larger bridge.

An interesting fact about these bridges was that they were designed for what our engineers called an E-80 loading. Up until that time, the old E-60 were the heaviest bridges that had ever been built. I don't remember exactly what that loading applied to, but 150-ton locomotives following each other at a certain distance, and this type of thing. But the reason for the E-80 design on these bridges . . . They were across the Emory River actually, which is in the Watts Bar reservoir. Somebody had determined that there would be some problems of some tremendously heavy, troop defense guns that were located along the Atlantic coast, and for various reasons they might want to get them to the Gulf Coast. All of the railroad routes that could be used for that purpose at that time had weak bridges on them, so that these bridges were built unusually strong to accomodate such loads. Now, of course, somebody in the TVA Design branch--Bill Calvert or somebody like that--could tell you much, much more about this, but it was an interesting thing to me that we built some tremendously heavy bridges there, and we built those bridges without interrupting railroad traffic. Two of them were built right, just alongside the existing tracks, forty or fifty feet to one side. We built them on temporary piers and interrupted the railroad traffic for one day while we moved these girders

that weighed as much as a hundred or a humdred and fifty tons--just slid them over into place. They already had the track laid on them and everything, so that we never did interrupt rail traffic for more than one day. Three of them we built like that; one was on the Little Emory River, farther out from the town. But we got these steel girders in from Bethlehem Steel and set them off the main line over onto the temporary piers and riveted them all, (Back in those days you riveted steel rather than bolted it like you do now) and put them all together and laid the track on them. And then when the time came we slid them over into place.

DR. CRAWFORD: Was that a new construction technique?

MR. WARDREP: I don't think so. It was something that we figured out. Of course, I don't know who all had a hand in deciding to do this work this way, but it was not the first time that this had ever been done. I do think that these were the heaviest bridges that had been built at that time; they were designed for a heavier load. The actual weight of the bridges was not heavier, but I remember the girders were slightly over 100 feet long and something like 10 feet deep, and weighed over a hundred tons. But it made a very substantial bridge. There were a few more or less minor railroad relocation projects in the area, but that one main line of the Southern there was the big one. It was the substantial part of the work and was rather expensive, as you can imagine, and was a substantial part of the reservoir work in the Watts Bar area.

But going from there back to the Hiwassee project, that got underway in the middle of 1941. The C & M Branch started hiring men just as fast as we could get drawings to do this work since we only had one year to do it,

and even just a fair-sized highway bridge is a good year's work, and normally more than a year's work. But at that time, too, steel had become hard to get on account of the war situation, and most of these bridges were designed as concrete girder bridges, using reinforced steel rather than structural steel.

Also at that time the TVA cleared the reservoirs with a group called the Reservoir Clearing Division, and these people moved in and started clearing the reservoir about the same time that we started backwater production and high-water relocation. And since the bridges were concrete girder bridges, they required a lot of falsework. We made a deal with the Reservoir Clearance people to saw a lot of the timber that they cleared into lumber--into 8 x 8 and 10 x 10 and 12 x 12--big heavy stuff that we could use as falsework on the bridges. We used more than a million feet of lumber that was obtained from that source by sawing up the trees that the reservoir clearing people cut.

DR. CRAWFORD: You went into the saw mill business, then, didn't you?

MR. WARDREP: Not at that time. We contracted the sawing. The Reservoir Clearance people cut the trees and the saw mill people would drag the logs in and saw them up and deliver them to the C & M Branch for use. I believe they used some of the lumber in other places, but the larger portion of it (well over a million feet) was used by the Construction and Maintenance Branch. Sometime later, after the war, I actually operated the sawmill for TVA. This was during the time that they had ceiling prices in effect, and nobody would sell you

lumber at the ceiling prices in effect, and nobody would sell you lumber at the ceiling price, and TVA couldn't pay more than that. So the only way we could obtain lumber was to go out and saw it ourself.

DR. CRAWFORD: Well, TVA certainly had a good deal of timber cut in the reservoir areas.

MR. WARDREP: They certainly did; that's right. And up until this Hiwassee project the Reservoir Clearing Division had contracted the sawing of a considerable amount of the timber, and the C & M Branch had used some of it--but not anything like as much as we had to use on our projects. The reason for this, of course, was the non-availability of steel and the requirement for a lot of falsework timber. And not only this, but we had about ten bridges to build at one time. On the previous projects we could build one and then go from that to another, and take them in rotation, but due to the speed of construction at Hiwassee, all ten or twelve big bridges had to be built simultaneously. For the same reason, it required a lot of men. We had, early in 1942, over two thousand men building bridges and roads with us. This was quite a job; it was a very interesting job because we had a lot of new people. We had to use so many people and work so fast. We had some people who were not so familiar with TVA, and one of my jobs was to keep everything going. I'd get in a car early every morning and would drive maybe a hundred miles that day, and still maybe not make it around to all the places. It would actually take me two days to go from one job to the other and just spend a few minutes at each job to see how the work was progressing, and find out what they needed to keep going and when they'd be ready to go somewhere else. There were no dull moments.

DR. CRAWFORD: You were working with these three separate projects at one time, weren't you?

MR. WARDREP: That is right. Each one of those projects had a Construction Engineer and a Construction Superintendent. Our work did not overlap, but in other words, some of our roads over were located right in their areas, and we had to work along with them and coordinate our work with theirs. Now, George Leonard, of course, was the Project Manager over the whole three projects. His office was down at Hiwassee Dam. He had an accounting section and everything there at the dam. But I believe most of the engineering was done at each project, locally--at Appalachia, Ocoee and Chatuge. This was something different than TVA had done before. Of course, the Ocoee project was another case where everything was rock. It was built more or less in a gorge along the Ocoee River, just as it came out of the Copper Basin area. Appalachia was the same type of thing; it was on the Hiwassee River near Farner, Tennessee, right at the North Carolina-Tennessee line. It was very rugged terrain in that area, and a large part of the work at the dam consisted in moving the rock and everything for foundation work. Chatuge was an earth-filled dam; it was farther back up on the headwaters of the Hiwassee, and there was some not exactly level land back in there, but it was more or less rolling hills. Not much of the work that we did involved rock excavation; it was construction of a type more similar to Watts Bar. It was a little steeper and more rolling country than the Watts Bar area, but not nearly so rocky and steep as it was at Hiwassee-Appalachia and Ocoee--these other projects.

DR. CRAWFORD: What do you mean by an earth-filled dam?

MR. WARDREP: The dam was built with an earth core to keep the water from going through. With the proper drainage provisions made, there is some seepage of water, of course, through any earth fill, so they put crushed stone in there to drain out any water that did seep through part of it. The main, water-stopping part of the dam was an earth fill. I've forgotten how many yards, but there was a considerable amount of earth used to build the dam itself. Then the upstream slopes of the dam were covered with heavy rock to avoid erosion from the weather in case the water ever over-topped the dam for any reason. Of course, the top of it was protected by a spillway along at one side of the dam that had concrete pavement.

I've left out one of the dams too. There was another one--Nottely. That was part of the Hiwassee project.

DR. CRAWFORD: That's near Georgia, isn't it?

MR. WARDREP: That's right.

DR. CRAWFORD: Or in North Georgia.

MR. WARDREP: That's right. I'm trying to think of the name of the little river it was on. It's a tributary of the Hiwassee. I should know that; I'll think of it when I quit trying. It flows into the Hiwassee River right at the town of Murphy, but Nottely was a rock-filled dam with an earth core. Now there is a difference, and the reason it was is because there was very little earth available for the dam at the Nottely project, but plenty of rock. So they built minimum earth core to hold the water back, and the main part of the dam for stability--to keep it from washing away and to guard against erosion and that

type of thing--it was rock-filled. At Chatuge the reverse was true. There was plenty of earth available, so most of the dam was built earth-filled to provide weight, stability--to keep it from washing out--and a minimum amount of rock on the slopes to guard against erosion. So there were the two types of dams on one project.

DR. CRAWFORD: What did you do at each of these sites as you traveled from one to the other? What were your duties?

MR. WARDREP: We had a field supervisor at every bridge and every road job, and my job was to talk with him and be sure that he was going to get the work that he was going to do done on schedule, to find out what probelms he had, and try to keep the cost of the work down as much as possible. The C & M Branch of the TVA was unique in some ways. We were in competition with private contractors. Anytime that it would cost us more to do the work than the TVA could get it done by contract, naturally they would go to the contract. And to keep us on our toes, they did that occasionally. At the beginning of the Hiwassee project, for instance . . . Well, this was for two reasons: we had so much work that we couldn't get equipment to do it with in the time allotted, and also to see how our cost compared with the contractor's cost. They took bids on four or five of the larger jobs and actually had contractors to do this work. And of course, their cost compared with our cost; that was true in nearly all of these reservoirs. Anytime the chief engineer, or whoever had any say-so about this--decided that that would be a good job to contract and we'll see how we can get it done cheaper that way, why they just . . .

Sometimes I thought that was a little bit unfair because the jobs they contracted were big ones, and they were well adapted to keeping costs down. You could set up a more or less production-type operation and keep your costs down, where we had to take everything as it came--the tough ones, and some of the bigger ones too. And on a small job it was pretty difficult to keep costs down because you still had drawings; you had quality control; you had personnel, and the same things that you had on the big ones. On a little one, it would get away from you if you didn't watch it closely, and this is one of the things that I did as I went from job to job there in the Hiwassee projects area. Since I had been with C & M some years previous to that, when things had been more or less on an even keel, I had some ideas about how to accomplish this more efficient operation. And this is what I tried to do: to keep everything going on time and the job done right, and done as efficiently as possible.

DR. CRAWFORD: Where did you live, and did you have to spend time on the road as you toured these areas?

MR. WARDREP: I lived in Murphy. I had a room and ate at the restaurants there in Murphy--I was still a single man. I'd go by the office; Lee Ragsdale was my boss. He was the Superintendent and I was Assistant Superintendent. I would go by and check with him to see if he had anything especially that he wanted looked after or anything done, and if he did, of course, I made that one of my places to go. If not, I'd just start out visiting the ones that it had been the longest since I had seen them. When the winter weather came on, it got pretty rough

at times to make it around there. Of course, there were some pretty good roads in the area--paved roads--and it was not too much of a problem to get there. It was just a problem of distance more than anything else. It would just take you so long to go from one place to other.

Nottely and Chatuge were about twenty miles apart; that's the Nottely River, of course. I couldn't think of the name of it a minute ago. The Nottely Dam was over on the Nottely River and it was about twenty miles across country from there to Chatuge; and then from Chatuge, back over to Appalachia was close to sixty miles; and then from Appalachia over to Ocoee was another fifteen or twenty, so that the nearest way you could go from Ocoee Number Three to Chatuge was probably seventy-five miles. You could spend several hours just actually driving from one place to another, but the biggest part of our work was in the Nottely-Chatuge Reservoir because the country was a little flatter there and those reservoirs covered more road. So I spent more of my time up in that area than I did around Appalachia and Ocoee.

DR. CRAWFORD: How long did this project last? When did you leave it?

MR. WARDREP: I left in August, 1942. I went on active duty with the Marine Corps, but the rest of the people were still there. By that time the water had already been impounded and we were on schedule. The Chatuge project impoundment was delayed one week by a man that had a heart disease and actually died. They couldn't move him; he was in the lower part of the reservoir and they could not close the gates and start impoundment because he couldn't be

moved. He was near death. And that week's grace saved us. We had a road that was built allright, but it was almost impassable from mud. This was in March, I believe, or somewhere along about that time. The man did later die, but in this week of grace that we got there, we got this road fixed so that traffic could use it. That was the nearest thing that we had to not meeting our schedule. Before I left this Murphy office--in the meantime--TVA decided to start the Fontana project, and they moved Mr. Ragsdale to Fontana; I became the Superintendent in the Murphy area. I had been going up to Fontana to do some work there in connection with core drilling for Fontana Dam, but that was driving up there to do the same type of thing that I had done before --seeing that they were doing what they should do, seeing that they had what they needed, and that sort of thing. But after water was impounded on these Hiwassee projects, every bit of it was all on schedule. Schedules were a pretty sacred thing in TVA construction. You did whatever was required to meet your schedule. There's just no such thing as not meeting your schedule, but as I say, the gentleman who had the heart trouble saved us from being late on this one thing. But it worked out, and the job had gotten down to where there was just some paving and seeding, and the touching up part of the highway--building shoulders and that type of thing--by the middle of 1942.

In the meantime I had been 1-A in the draft, and TVA had gotten me deferred for six months so I could kind of get this work down to a point where there was very little left to do. In the middle of August I left the Hiwassee projects and I went to Quantico on active duty with the Marine Corps, and I forgot just who did take over. We only had a hundred men or

so left, and the work that was left to do at that time was mostly moving equipment and materials out of the area. A lot of the materials went to Fort Loudon Dam, which had started construction by that time, and most of the equipment went to Fontana where Mr. Ragsdale was. I didn't get back to TVA, then, until I believe it was November of 1945.

DR. CRAWFORD: And, of course, you found much of the wartime construction over by that time?

MR. WARDREP: Yes. At that time they were winding up Fontana and Kentucky and Fort Loudon. All three of those projects were in pretty late stages. Of course, during this time, too, that we were building Hiwassee projects, there were some other people on hurry-up work of the same type (had one year to do it) at Cherokee and Douglas Dams. As I say, TVA was trying to provide as much power as possible in the shortest length of time, and I don't know whether anybody knew about the atomic energy deal at that time or not. But as it turned out, of course, it was a very favorable thing; I'm sure that that dictated the location of Oak Ridge at the spot that it's in--in fact that TVA had so much power there.

DR. CRAWFORD: Briefly, what about your Marine Corps experience: what did you do? Where did you go, and were you in engineering work?

MR. WARDREP: I was signed up as an engineer specialist in the Marine Corps by, incidentally, an old TVA hand. George Tomlinson had been in the General Manager's office of TVA and was a Marine reserve officer, and he went on active duty and wrote me a

letter. I had been trying to get into the Seabees because I thought it was along my line of work, and that any knowledge or skill that I might have might be of more benefit in an outfit like that. But they were sort of holding me off. They wouldn't give me a commission, and they didn't turn me down really either. So George wrote me this letter and said if I still would like to get in the service that they had an opening in an aviation engineer battalion as a first lieutenant in the Marines. And so in about ten days I had a commission as a First Lieutenant in the Marine Corps.

Of course, during that time I had been to Nashville to get a physical from a Navy doctor. I ran into George, he (Tomlinson) had come from Washington to Knoxville just for a weekend visit, down in the bank one Saturday. He said, "When would you like to go on active duty?" And I said, "Well, George, I guess the sooner, the better," and he said, "Well, how about a week from Wednesday?" So a week from Wednesday I went to Quantico where I took all these shots and went to the rifle range. All Marines have to go out and shoot a rifle, lieutenants and all. I was in a group, though, of other specialists--officers that the Marine Corps had recruited, various kinds of specialists. I stayed there about ten days and went to what the Marine Corps called New River at that time; it is now Camp Lejeune over in North Carolina, and I was assigned to the Second Engineer Battalion there. Of course, I hadn't been away from TVA but a very short time then, and we stayed at New River. I trained, then, with the Second Engineer Battalion. I was able to teach some of those boys how to run cranes and shovels, and various types of equipment. Of course, these boys were drugstore clerks and what have you, just out of high school and all. So we learned some

elementary engineering and a lot of military tactics there at New River, and went to Camp Elliott, California in November of 1942. I became a company commander of an engineer company, still as a First Lieutenant, because the major who had been in command of that company was put in charge of the First Battalion, 19th Marines, and the 19th Marines was an engineer regiment. I was certainly not prepared to be a company commander with my about-two-months experience in the Marine Corps, but I dug it out someway. Along about the time I was getting where it was a little easier, they returned a Marine captain from Samoa to Camp Elliott, and he took over.

I saw the man who had previously been my commanding officer, Jack Goodwin, and somehow or another I got wind that they were going overseas. And I said, "Of course, you can't tell me, but if you're going overseas, I'd like to go with you." He said, "Did somebody tell you something?" And I said, "No," but I guessed right, and in about three or four days he called me. He was at the other Marine camp. I was at Camp Elliott and he was up at Royst Hill, a big Marine base there on the West Coast. He called and said if I'd like to go, I'd be relieved from "B" Company. At that time I was Executive Officer of "B" Company, Second Engineer Battalion, 19th Marines, which was an engineer regiment, and on January 15, we sailed for New Zealand. So somewhat less than six months after I joined up with the Marine Corps, I was on my way. We went to New Zealand and trained with the Third Marine Division until the first part of June 1942; then we moved to Guadalcanal and continued training there.

Then on November 1 of '42, the Third Marine Division hit the beach at Bougainville. We captured the beachhead at Bougainville and I stayed

there until January 1, 1944. This was, of course, '43 when we were in New Zealand and Guadalcanal. I went back to Guadalcanal and started training at that time for a landing at New Georgia, but somebody later decided that that would be too costly, so we started to train then for the recapture of Guam. In July of 1944 I participated in the assault landing on Guam, and of course we sort of set up base camp on Guam, and we didn't know it for a while, but we started training for the landing at Iwo Jima. In February of '45 we all went aboard ship, and I believe it was February 19th we hit the beach at Iwo Jima. The day we were supposed to leave Iwo Jima, which was about the first of April of '45, General Erskine came with a group of four or five officers down there, and he said he had good news for us; that everybody that had been out with the Third Marine Division all this time (which I was one of them) was going to get to go back to the states when we got back to Guam, and of course, that was good news.

So we went on back to Guam the latter part of April. About April 22 or so I went aboard the battleship, Maryland, and came back to the United States --landed in the Puget Sound Navy Yard. My present wife was waiting for me in Los Angeles. The Marines took us by train down to the Marine base at San Diego, and I went on leave from there. We were married in Los Angeles and came back to Knoxville for a thirty-day leave. Then from there I went back to Camp Lejeune, with the idea, I guess, that if they needed me, I would get to stay in the states a while and go back. Well, while I was at Camp Lejeune they dropped the atomic bomb and, of course, the war ended.

DR. CRAWFORD: In what month were you discharged?

MR. WARDREP: I was discharged in September, I believe--

September of 1945.

DR. CRAWFORD: And when did you return to TVA?

MR. WARDREP: Just as soon as I got home, I went around to see Mr. Lebby, and of course, I had reemployment rights. But Mr. Lebby told me that if I insisted on having my job back, they were going to have to lay off a fellow that was an old, old friend of mine, and I was going to have to write a report on the job that I had never been on--this work at the Kentucky reservoir. So I started looking for me another job. I even went up to Milwaukee and talked to the Beshirer Sharing Company and some other people, but about the time I thought things looked pretty blue, Ed Tate called me. He called me one Thursday night and said, "Go down to TVA personnel tomorrow, get you a TVA car, and be at Appalachia power house Monday morning at eight o'clock."

DR. CRAWFORD: What month was that?

MR. WARDREP: I believe it was November of '45.

THIS IS THE ORAL HISTORY RESEARCH OFFICE OF MEMPHIS STATE UNIVERSITY. THIS PROJECT IS "AN ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY." THE PLACE IS KNOXVILLE, TENNESSEE. THE DATE IS OCTOBER 6, 1972, AND THIS IS INTERVIEW NUMBER FOUR WITH MR. A. J. WARDREP. THE INTERVIEW IS BY DR. CHARLES W. CRAWFORD, DIRECTOR OF THE MEMPHIS STATE UNIVERSITY ORAL HISTORY RESEARCH OFFICE, AND WAS TRANSCRIBED BY MRS. BRENDA P. MEIER.

CRAWFORD Well, let's pick up in November of 1945, Mr. Wardrep, and follow your jobs through there.

WARDREP TVA had had problems keeping their operating employees at the Appalachia power house, which was in a very, very remote location. The power house was located at Smith Creek, and it's about twenty miles from anything. The people had been living there in a village that TVA built for them, but they had no doctor and they had had problems getting in and out to buy groceries, and they were just generally dissatisfied with things. So they decided to build a bridge there across the river at the power house which would allow their operators to live in places like Etowah and Benton, and drive in to work.

The job that I was assigned was to take an old suspension bridge that had been used at the Watts Bar project for hauling materials; that is, to get concrete over into the dam--to build this suspension bridge across the river there at the Appalachia power house. Of course, the cables and the deck and everything were available, and I had to cut the cables down. When the thing was redesigned, it was capable of carrying an automobile or a light truck, but the design people didn't think it would be worthwhile to build it for truck traffic because somebody would put a fifteen-ton truck on it if they did. It was just built as a foot bridge and then we built a parking area on the other side so the

operating employees could drive up on the right bank of the river and park their cars and just walk across, right into the power house. I spent the winter, then, of 1945-46 putting this bridge up. I had to drill anchorages back into the rock and build concrete piers to support the towers for the cables. In the meantime we improved the road; the road was just barely passable at that time. Your car would bump over rocks and drag in the middle, and everything, but we got some grading equipment in and graded about three or four miles of this road and bought crushed-stone and surfaced it, and built a bridge into the power that, of course, is still being used.

Later on, this village up on top the hill was moved out of there. Just nobody lived in it, and TVA moved the houses down to Wilson Dam and re-erected them down there. But the bridge, then, was completed in the early part of 1946 and Mr. Lebby was manager of the Construction and Maintenance branch there, but still had his office in Chattanooga. He called me in to talk to me about going to work as his assistant there in the branch office. This was probably somewhere around April of 1946, but in the meantime they wanted some piles driven for navigation purposes--pile clusters in the Chickamauga and Watts Bar reservoirs for barge traffic. We drove pile dolphins as they are called, which is just a cluster of timber piles driven into the river bed, above and below the Watts Bar dam so that when they would bring a tow to go through the lock, they had something to tie their extra barges to. And then in two or three places on each reservoir we drove a few pile clusters so that a big tow that was caught in a high wind (a so-called safety harbor) could tie up to these piles until the wind blew itself out. But that was just a small job.

I completed that and then I went into the Chattanooga office, on the first of July of 1946. My duties there as assistant to the branch manger were in the way of keeping up with equipment--where the equipment was located and what we had and what kind of condition it was in--and helping to obtain the needed

materials on the jobs. At this particular time the branch had an office at Knoxville and one at Wilson Dam; at both of these places we were doing quite a bit of work. It didn't keep me too busy doing those things, so any small jobs that came up--emergency jobs or anything of that type--I would hire some men and supervise that work.

One of the jobs that I had was the completion of the Fontana visitor's building. The Fontana project had been completed right at the end of the war, and they had been unable to buy such things as marble and aluminum and the fancy trim work that they wanted on this building, so by this time these materials had become more or less available. One of the jobs that I did was to install doors and windows, and marble walls, and terrazzo floors, and that type of thing in the Fontana visitor's building. Another little emergency project came up down in the Ocoee reservoir; the constant rise and fall of the lake level due to generation in the daytime and no generation at night had undermined a bridge pier down below Copperhill, and the bridge was about to fall down. I was assigned the job of getting this bridge back in shape. As I mentioned a while ago, ceiling prices were in effect at this time and TVA was having a bad time trying to obtain lumber.

In some way most of the lumber producers were able to get more than the ceiling price, and of course TVA had no way to pay more than that for it, and as a result they were going without lumber. So Mr. Lebby said, "Well, we'll just start our own sawmill." I went out and bought a second-hand sawmill from a fellow up in Meigs County, and the TVA Reservoir Property's Division showed me some areas in the Chickamauga Reservoir where I could cut the trees that belonged to TVA, and in fact they even marked the trees that I could cut (these things that TVA had been preaching all along as to selective logging--harvest the mature trees, and that type of thing). So we went into the lubmer business, set up a sawmill out at Daisy, Tennessee, which is about twenty miles out of Chattanooga, and we also bought a

planer. We sort of had a lemon on our hands in the planer; it was an old machine, but this near after the war it was all we could find. So we sawed, and planed, and delivered to other branches of the TVA something like three million feet of lumber during that year of 1946-47. It became known as the "thick and thin" lumber company branch of TVA. (Laughter) They were, of course, teasing me about the dimensions of our lumber, but it was a good deal, I think, all the way around. We were able to produce our lumber at prices less than we would have had to pay for it, including the fair price for the timber on the stump. After we sawed out most of the available timber on that side of Chickamauga reservoir, though it got to where you could buy lumber locally again, and the sawmill went out of business.

So just about that time--this was along in there from 1946, '47, '48 and '49--I had these various assignments like the bridge at Copperhill and the work at Fontana, but another thing was the completion of the Fort Loudon Power House, which was in the same category as Fontana. They had been unable to even buy decent door hardware there right at the tail end of the war, and we brought hardware in to put on all the doors in the Fort Loudon power house. They did not landscape the area around there because of the high price of landscaping materials and the shortage of labor, and everything, so we bought shrubs and did a landscaping job there. Several smaller jobs of that type kept me pretty busy there during those years.

Sometime in 1949 TVA and the Bureau of Public Roads decided that they would build a bridge across the Chickamauga Dam. A bridge had not been provided when the dam was built because the traffic in that area wouldn't justify the cost, but by this time Chattanooga had grown to a considerable extent and they decided that they needed a bridge. I was assigned the job, then, of building just a substructure of the bridge. TVA was to build the substructure and the Bureau of Public Roads contracted the superstructure--the steel part of it, the upper part of

it. That was a pretty good size job, of course, if you've ever driven across that bridge. It's better than a half mile long and it's a fairly high bridge. The project was on the order of several million dollars.

I just got started good on this bridge when the TVA decided to build the Shawnee Steam Plant. In the meantime another group had started the Johnsonville Steam Plant--that was the first of the big, modern steam plants. Modern at that time; that's twenty years ago now. Work had been started in 1949 and they were getting pretty well along with it--with the preliminary work at least--and decided to build another steam plant at Shawnee. So they sort of divided up the personnel at Johnsonville to take some of them up to Shawnee, and it left the position of assistant construction superintendent at Johnsonville open. So that when this change had been made, Hendon Johnston was made project manager and he sent for me to come over there and talk to somebody about being assistant superintendent, which was a raise again for me. I went over there and talked with them and they decided that I would be transferred to the Johnsonville job. This was in about February of 1951. The biggest job that I was doing at that time was this Chickamauga Bridge and a few other minor things that I don't remember too well.

But I had been living, from '46 to '51 in Chattanooga, and in February of 1951 I moved from CHattanooga to Waverly and went to work as assistant construction superintendent on the Johnsonville Steam Plant. The operating date for our first unit on that plant was November 1, '51, and when I got there, unit one and two--the part that was most advanced--was still down in the ground. They had started erecting steel framework, but we did a lot of overtime work and it was really a busy summer. We did put the first unit of that plant in operation of the scheduled date, but it required a lot of overtime work. At one point there during the summer we had over two thousand people, and went on in three shifts. Of course, they didn't have their full force on three shifts,

but the concrete pouring and anything that could be done efficiently at night was carried on in two and three shifts. We had, of course, more electricians and pipe fitters, and more skilled craftsmen on that project.

I'm sure that we had more than the TVA had ever had before because there is so much more electrical and mechanical work on a steam plant than there is on a hydro-project. A hydro-project runs heavily to carpenters and laborers. Of course, you do have your iron workers and electricians, and fitters, but on a steam plant there are so many more skilled occupations than are on hydro plants.

But, again, we made our operation date of November 1st--I'm almost sure it was sometime in November anyway that the first unit was put into operation at Johnsonville. Well, after unit one it was unit two, three and four, and shortly afterward they decided to build five and six, so it was a six-unit steam plant at the time I was there. It had four 125-megawatt (as the expression is now) units, and two 150's. Units five and six were 150-megawatt. Of course, the construction of a steamplant is exceedingly complex. Maybe there's a roomful of drawings to get one built, but it does become more or less a production type operation as you go along. You excavate and pour your foundation, and set your steel and start installing pipe and wiring conduits, and do the masonry and everything as you go along, especially when you have six units as we had there. One unit will be in the initial stages while some of the previous units are in the final stages. You just kind of keep the same crew and keep going.

But at the time Johnsonville was started, it looked like TVA had just about run out of construction work, and by the time it got well along they had already started additional steam plants at Widow's Creek and shawnee, and the size of the TVA construction organization grew considerably larger than it had ever been before. The major steam plants--these big steam plants--required so many more people to build that I wouldn't know for sure. But I would guess that the construction organization grew to twice the size that it ever had been before that,

along about '53, '54. I stayed at Johnsonville until unit 6 was on the line. This was in 1953. In the meantime the decision was made to build a steam plant at Rogersville--the John Sevier Steam Plant--and project manager, Hendon Johnston, and Arthur Morrison, the superintendent, and all the supervision from Johnsonville moved on over to John Sevier. I was left with some of the clean-up work after the units were on the line for about the last six months that I was there at Johnsonville. In July of 1953 I moved from Johnsonville over to John Sevier as assistant superintendent again, and at the time I got to John Sevier we had units one and two to be built. As the job went along, that grew into units 3 and 4 also. I got in, of course, at the beginning of the John Sevier Steam Plant. They had only been working about six months, and I stayed there from July of 1953 until July of '58--five years. It was sort of a production operation, assembly-line deal. You start off to build unit one, and excavated for it and poured your foundation, and set the steel. Before it was finished, they's start unit 2 and come up with that, and just right on out to units 3 and 4.

These later steam plant jobs were very interesting. One of the highlights of the job was the raising of 200-tons boiler drum about 200 feet up in the top of the powerhouse.

Of course, one of the things that I remember about the steam plant construction is the initial operation of these units. There again TVA construction (as they had since the beginning, to my knowledge) kept theri operating dates rather sacred, and you almost had to do that. If you keep letting it slip, you never will get the job completed. So I've forgotten when the operation dates of each of these Johnsonville units was, but I do remember that we made every one of them. And of course, at the initial operation of each unit we'd have Mr. Leonard, and the board of directors and several people around to see it turn over. But from my standpoint, the week before that unit went into operation was a somewhat hectic

time. You just had an incredible amount of wiring and piping, and such things as boiler feed pumps and coal pulverizers and air compressors and condenser cooling water pumps--all these things had to be ready to operate. And of course, as you got them put into place and wired up, you would do the initial test and then go on rom there to get everything right ready to operate.

But in this week previous to the initial operation of any one unit, the boiler had to be cleaned out, all the debris gotten out of the condensers--that is, each one of these condensers has 10,000 plus brass tubes in it, and, of course, it takes months to put it together. You find everything inside there from hard hats to lunch boxes on down--welding rods--and all this has to be cleaned up. It's all inspected by the TVA engineers and by representatives of the people that furnish this, and the boiler is fired up and they turn the oil burners on and warm them up, and then turn the coal burners on and see that they operate, and everybody checks the boiler's hung from the top. It's not supported at the bottom, and as it warms up it expands--it drops down. All the engineers had their various observation points to see that it's expanding on a straight line and not getting a kink in it, but what happens is that the assistant superintendent and the superintendent, and just about everybody in supervisory positions, works about twenty-four hours a day for a few days just previous to this initial operation. The safety valves had to be set too. Of course, as I remember the John Sevier boilers, the safety valve operating pressure was around 1500 pounds per square inch or something like that, but there is just a tremendous amount of detail that has to be taken care of in the days prior to the initial operation of these plants. Now I just mentioned this because I think it is interesting as far as steam plant construction goes, and it applies to our work at Johnsonville, John Sevier and Widow's Creek--three of them--and that's three of the many steam plants TVA has built.

CRAWFORD That's very interesting. I certainly knew nothing about those details.

WARDREP Well, I've had people--even engineers that I knew that weren't connected with the construction of these things--to just stand there and look, and say, "How do you ever get a thing like this done?" Well, you divide it up in little peices; that's the way you do it. Each man is responsible for certain details of it, and he looks after his part, and when you get through, everything comes together. This is why you have such a hectic time in the few days prior to your initial operation; to check and see that all these other things are ready--your cooling water supply and your boiler feed supply, the condensers. And of course, a mistake could be pretty costly if something wasn't done right on this thing. When you're thinking of, back in those days, a sixty million dollar unit--you just don't want to make any mistakes. And, of course, they're designed with all kinds of interlocks. For instance, if the condenser cooler-water supply fails, the interlock shuts the fire off in the boiler. If it didn't, steam would keep going through the turbine and back up on you, and maybe blow something up. So even though the thing is all designed with safety interlocks, it still takes a lot of human supervision.

CRAWFORD How was all this developed? This was a fairly new technology, wasn't it?

WARDREP A million-pound per hour boiler at the time the Johnsonville project was built had been somewhat rare. I don't know how many of them had been built in this country up to that time, but not too many. About a million pounds per hour would mean a boiler that evaporates a million pounds of water each hour, and of course, you get that same water back into it over and over again. But Johnsonville in its time was one of the largest units that had been built. Of course, it was 125 thousand kilowatts and the boiler was just slightly over a million pounds per hour. In contrast to that, Bull Run is three

million pounds per hour, and one billion kilowatts or something like that--one thousand megawatts. So as the years went by there, considerable progress was made in the design of these boilers and turbines, and all of the appurtenances.

Some of these later units are so big that the boiler feed pumps are driven by steam turbines rather than electric motors. They got so big that electric motors that size would be so expensive that it was cheaper to drive them by steam turbines, and use the steam from the same boiler. Of course, you've got plenty of steam. But some of the older units used 2800, 3000, 3600-horsepower electric motors to drive the boiler feed pump. There was just a lot of development made in the way of boiler improvements and turbine improvements, and all of the auxiliary coal pulverizers and that type of thing.

TVA, I think, helped pioneer in that respect. At the same time, there was Combustion Engineering, General Electric, and Westing house and all these people who were furnishing these big units to TVA. They were building some for others too, but generally the TVA's were about the first to go into operation, Of course, nobody knew they were going to work until they got them started, because they just hadn't built one that big before.

CRAWFORD It's sort of that way with anything new, I suppose.

WARDREP Yes, and that makes it interesting. When you're breaking the trail, so to speak, it makes an interesting job out of it.

CRAWFORD Did you ever have any serious accidents or malfunctions with this work?

WARDREP Yes, the construction organizations that I was connected with had a minimum number of accidents. In fact, we won the National Safety Council's Award several times for safe work. TVA has been outstanding in

that respect; generally their construction division has. But I can remember the first fatal accident that I recall at Johnsonville. It was an iron worker that fell from the steel to the concrete below and was killed, but we had some other accidents that nobody was hurt in, but caused some property damage. We had a 40-ton crane that got loose and rolled down the hill over there one day, and whipped the boom right over the cab, and it fell right in a group of workers. Miraculously, nobody was hurt, but the thing was going up the hill and the traveling gear slipped out and just turned it loose. It just coasted down the hill like a rooler coaster, and the thing weighed about 125 tons. It was a pretty big thing to be just running loose.

We had a fire there at Johnsonville. Something caught fire down in the coal unloading crane, and we were able to get the fire out without a whole lot of damage and without losing very much time as far as the schedule was concerned. But all in all, our safety record was pretty good. At John Sevier, I can't remember too much. We had minor accidents there, and we had one man killed. The only man that I remember to get killed there died when a timber about the size of a crosstie fell through a hole from one of the intermediate floors, and he was an iron worker, working at the base of one of the steel columns. This timber came, just end-on, right down and hit him on the top of the head. It killed him instantly. But we didn't have anything in the nature of catastrophes there. I can't remember anyplace that the TVA has had. We may have had minor form collapses and that type of thing, but that's one of the things that the construction man does--is to guard that type of thing.

Now, Widow's Creek is the place that I went to in 1953, after we completed the John Sevier plant. I stayed at John Sevier until the summer of 1958--in July of '58. I did the same thing up there that I had done over at Johnsonville; and that is, supervise the initial clean-up work and the installation

of the fancy work--all the trim and that type of thing. The first group of our construction organization went on to Bridgeport, Alabama and started this Widow's Creek plant, and I stayed at John Sevier. Of course, even when I left in July of '58, there were some fifty to a hundred men still working there, getting all of the last stages completed. But Widow's Creek was just sort of another same-type of operation as Johnsonville and John Sevier, except that the generating unit was a 500-megawatt, and the boiler was about two million pounds per hour. They were just getting bigger all the time. Each one we built was givver than the last.

You asked about castastrophes and that type of thing. One morning at Widon'w Creek I was standing outside the general forman's office there, talking to one of the construction formen, and I heard this engineer. . . He was agitated about something and came running up to Danny Towers, the superintendent, and said, "The U-bolt is broken that supports the boiler drum." We had already hung this 200-plus-ton boiler drum up in place in the stee, in the powerhouse frame, and it was supported by these huge U-bolts. The steel that the bolt was made out of was six inches in diameter and bent in the shape of a "U", and the whole thing was about 18 feet long overall. The drum hung down in the "U" part of the bolt--there were two of them; one at each end--and the nuts were up on top in the support steel. But they had already started work and had the men inside this boiler drum, when somebody looked up and saw that the bolt was actually broken and parts of it separated by four or five inches. Of course, I don't know what kept the drum hanging up there, but it was still hanging up there, and of course, I didn't waste any time. I climbed up there--it's the equilavent of about a 12 or 14-story climb up to the boiler drum, and in the meantime I started some other people out to get everybody out from under the thing--to clear all the floors below--because we didn't know when this had happened, or how, or anything. All we knew was that it was broken. Truthfully, it's hard for me to believe that it was broken.

The reason that I went running up there was to see for myself, but it was. That big, 6-inch diameter steel bolt was just snapped off like a matchstick.

CRAWFORD How large was the drum?

WARDREP The drum was about fifty feet long, and I would say seven feet in diameter--something like that. It was made of steel, about four inches thick. It was just a big cyclinder with rounded-off ends. Of course, that was done to help it resist pressure, and it had holes in it where the tubes came in, but it was hung up there in the steel and we were getting ready, of course, to hang these other things on to it. They had been inside working on it, but we immediately started then to get the cables and various other means of temporary support up there and kept everybody out from under it until we got it back to what we thought was safe, so that there was not much danger of it crashing down through the powerhouse. If it had, it would have caused millions of dollars of damage, even though we had everybody cleared out of there. But our investigation indicated that it probably broke in the middle of the previous night. The public safety officer that had been on duty there the previous night reported that he heard a sharp sound like he said he thought at first was a gun or something that had fallen from the top floor down to the ground. He had gone over there to investigate, but of course, he didn't see anything. Nobody had noticed it until this next morning when the engineer happened to look up and see it. Of course it was reported right away, and we got everybody out of the way. That's just something that could have been a disaster. The Combustion Engineering Company had spent, I guess, close to a hundred thousand dollars remedying the situation to make it good; it was their U-bolt--hanger bolt. They to furnish another one. They cried quite a bit--said it cost them a hundred thousand dollars. I guess that's probably true. It sounds like an expensive bolt, but they put a lot of money into

Magnafluxing and all these various processes they go through to make a bolt like that for the job that it does.

CRAWFORD That was about 1958?

WARDREP This was '59 or so. It was sometime in 1959 I'm almost sure, because I worked at Widow's Creek from July of '58 until in January of 1960. Mr. Henry Lofft, who was chief construction engineer at that time, sent for me to come to Knoxville, and when I got here he told me that W. B. Richardson, who had succeeded Mr. Lebby as head of the Construction Maintenance branch, was going over to power construction. Power construction had offered him a better job, and, in turn, Mr. Lofft was offering me the job as chief of the Construction and Maintenance branch, which was the old branch that I had been working in all back in the late thirties--before the war and after the war--until I went to Johnsonville and started on the steam plants.

So of course, I accepted that job. I had been living at Bridgeport, Alabama while I was working at Widow's Creek, and I moved then from Bridgeport into Chattanooga and took over as the chief of the Construction and Maintenance branch. At that time the C & M branch work was at a rather low ebb. They were building the latest visitor's building out at Norris for one thing, and had done some work up at Fontana in preparation for putting the incline car that you see when you're up there, and some smaller grading work. They were grading for substations for power construction, and not much more than that--maybe a few smaller items.

CRAWFORD Was this 1960?

WARDREP This was early 1960. I went to work in February of 1960 back at the C & M Branch.

THIS IS THE ORAL HISTORY RESEARCH OFFICE OF MEMPHIS STATE UNIVERSITY, THIS PROJECT IS "AN ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY." THE PLACE IS KNOXVILLE, TENNESSEE. THE DATE IS OCTOBER 6, 1972, AND THIS IS INTERVIEW NUMBER FIVE WITH MR. A. J. WARDREP. THE INTERVIEW IS BY DR. CHARLES W. CRAWFORD, DIRECTOR OF THE MEMPHIS STATE UNIVERSITY ORAL HISTORY RESEARCH OFFICE, AND WAS TRANSCRIBED BY MRS. BRENDA P. MEIER.

CRAWFORD Let's start with your move to Chattanooga in 1960, Mr. Wardrep. Then we'll try to get through the next decade as quickly as we can since we need to do it in a fairly short time.

WARDREP As I mentioned previously, the C & M Branch had a very light work schedule at the time I returned in 1960. We managed, though, to pick up a few work assignments along the way. We kept a few men busy, and from that time right on we began to pick up. When they started the Melton Hill Dam we got some work assigned to us; all the initial stages of the Melton Hill Dam were assigned to our branch, and the initial work on the Bull Run Steam Plant. From the year 1960 on up through 1965 our workload increased.

We did such things as investigate the coal deposits up in Pineville, KY and a lot of other miscellaneous projects, but primarily their work consisted of initial work on the Melton Hill hydro-project and the Bull Run Steam Plant, and the final phases of the Shawnee Steam Plant and the steam plant over near Lebanon, Tennessee (Gallatin). I'm getting old and have a hard time remembering names. All these things built our force up from something like 100 men, when I went there in 1960; we were getting 600 or 800 by 1965--keeping that many men busy. We were assigned the flood control projects up at Bristol, the flood control project there in Chattanooga, and the Stringer's Branch flood control work.

And then in 1965 we decided to combine what was then the C & M Branch with the existing construction plant branch, which was located here in Knoxville and our branch was moved from Chattanooga to Knoxville. All we had there was an office; we did have a warehouse located out at Chickamauga Dam, but it stayed there. We moved the office, which was about 14, or 12, maybe, people from Chattanooga here into Knoxville in 1965. Of course, I moved along with it; I moved my family from Chattanooga to Knoxville. Then we got here in Knoxville we began to pick up even more. We got to be the dirt-moving specialists for TVA or bridge building. Anytime there was dirt to be moved or bridges to build, the work was assigned to us. It ceased to be the Construction and Maintenance branch--stopped when we left Chattanooga--and was known as the Construction Services branch after we moved up to Knoxville.

We completed the flood control work up at Bristol and we were assigned the flood control project at Coeburn, Virginia. All the work on the Tellico project was assigned to the Construction Services branch and this was quite a sizable construction task. The first thing we did was build the concrete spillway section of the dam down at Tellico, and then when that was completed, we moved up to Niles Ferry and built the Highway 411 bridge, which is about a six million dollar bridge, and of course, that bridge is in use now. I can remember some of those older jobs better than the newer ones, because we had so much going and it's hard to recall. Oh, the Nickajack project--I haven't mentioned that.

We did all of the highway and railroad relocation and a little bit of backwater protection for the Nickajack Dam. This started before we left Chattanooga and continued until sometime after we had moved into Knoxville here. The Construction Services branch--construction organization--varied during these years; that is, from 1965 until '71. I retired in March of 1971. We employed from about 700 to 1100 people; it was somewhat seasonal. We generally had 1100 working

through the summer months, and dropped back to about 700 or so in the winter. Of course, at Bristol, that project consisted of two I call them run-through dams. One had a 30-inch, I believe, and the other had a 36-inch pipe running through it. Any water that wouldn't go through that pipe would back up behind the dam so that that was all that was allowed to run down on the city of Bristol--was water that would go through those two pipes. They are each in a different watershed, different creeks, and the flood control work at Coeburn was just to clean out and straighten the creek channel that ran parallel to Main Street, right down the main street of town. That was another palce, though, where most everybody liked TVA because we kind of got them out on a bind. Just prior to the time that TVA went in there, they had a more or less disastrous flood that had been up three or four feet in the floor of the bank and in city hall there, and they were pretty glad to see us.

We also did a flood control job up at another place in Virginia. Let's see, I'm trying to think of the name of that.

But the biggest things that we did, of course, were this work at Nickajack, and then we also did some initial work for the Raccoon Mountain Pumped Storage Project. We built some roads for them and did a tremendous amount of core drilling for that project. Of course, it's all underground in this rock and required pretty intimate knowledge of the underground conditions.

Also, during this period we installed remote control facilities in the Fort Loudun, Kentucky, Fontana and Blue Ridge, I believe, powerhouses. The remote control facilities were partly electrical and pipe work. They built monitoring systems into the generating units so that the people in the control room could tell if the bearing was running hot or it was running low, or anything was happening out in the generating room. Prior to this time they kept men out there to watch it, but TVA decided that it would be economical to put all this equipment in. It cost maybe a hundred thousand dollars a unit, but they'd get that cost back in just a few yaers by saving the price of a couple of men on each

shift. And just about all of the TVA's power plants are now run that way; you don't see anybody out in the generating room. A fellow sits there at his desk and watches this console, and if anything happens a light flashes on or a bell rings, or something like that. There was some resistance, as you can imagine, to doing that type of thing. Some people said it would never work. "The machine won't do a man's job like that," but so far it has. It has been successful and they have a minimum number of people to operate each one of these units.

Those are sort of the highlights of the things that went on up until the time that I retired.

CRAWFORD Exactly what time did you retire, Mr. Wardrep?

WARDREP At the end of March of 1971, and I was succeeded by J. C. Neergaard, who is the present incumbent in the job that I had.

CRAWFORD Were your headquarters in this building, the New Sprankle Building?

WARDREP Up until about a year before I retired, the headquarters was in the Union Building here in town, and they moved Construction Services and the Construction Accounting branch out to the North Shore building out in West Knoxville, and we worked there at the time of my retirement.

CRAWFORD How many people did you have in the Construction Services division, approximately, at the time you retired?

WARDREP About 900. Of course, that included people in the office and the various storerooms around, and out in the field too. This number of people were scattered all the way from around Knoxville here, all the way down the river to the Shawnee Steam Plant--a few people here and there, and they moved around as the jobs came up.

One of the things that I failed to mention here. The money got short on the Land Between the Lakes project; this was approximately two years before I retired and even up to right now, all of the construction work that is being done in the Land Between the Lakes project is under C & M supervision.

CRAWFORD About how many engineers did you have in Construction Services when you left?

WARDREP Fifteen, or something like that, but those were just construction engineers. Now all of the design and everything for these projects was accomplished by the Design branch here in Knoxville, or some of it in Chattanooga. All along during this period we still graded for steam plants and built tower foundations for the Power Construction branch. They build the lines; they've got people that are highly skilled in the erection of these towers and stretching of wire, but they didn't have people who knew how to build concrete foundations and do excavation work.

And one other sizabel job that I was about to forget; that was dredging. In connection with the Melton Hill project, we had t dredge a channel below the dam for some distance. We bought a different dredge--a hydraulic dredge--and got in the dredging business, and stayed in that for three or four years.

CRAWFORD You did several different things.

WARDREP You can just about name it, and we did it! Well, when this dredging came up, I just went out and hired somebody who had a lot of dredging experience. Of course, I had been connected and located close to dredging myself, but generally speaking, that's what we did. When something came up that was out of the ordinary, we found people that knew how to do it.

CRAWFORD Well, it's been a very interesting career, Mr. Wardrep and I can see you have enjoyed it.

WARDREP Yes, sir, I certainly did. I was fortunate in being able to work at something that I liked all those years, and there were just no dull moments. I think construction is an exceedingly rewarding career anyway because when you get through, you can stand back and see what you've accomplished and think about how nice it is for people who roll across the Tennessee River on a nice bridge; that it just takes them a few seconds rather than having to stop and wait for a ferry and all that sort of thing. There's a lot of satisfaction connected with it

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